

CLAIMS:

1. A method for processing a photoresist-coated board comprising steps of intermittently projecting a pulse-like laser beam onto a photosensitive material layer on or above a light absorption layer provided in the photoresist-coated board to expose the photosensitive material layer to the laser beam, and developing the photosensitive material layer, thereby forming a raised and depressed pattern on the photosensitive material layer.
2. A method for processing a photoresist-coated board in accordance with Claim 1, wherein a duty ratio of the pulse-like laser beam is varied in accordance with a length of a depressed portion or a projecting portion of the raised and depressed pattern to be formed.
3. A method for processing a photoresist-coated board comprising steps of intermittently projecting a pulse-like laser beam onto a photosensitive material layer provided in the photoresist-coated board to expose the photosensitive material layer to the laser beam, and developing the photosensitive material layer, thereby forming a raised and depressed pattern on the photosensitive material layer, wherein the method for processing a photoresist-coated board further comprises a step of varying a duty ratio of the pulse-like laser beam in accordance with a length of a depressed portion or a projecting portion of the raised and depressed pattern to be formed.
4. A method for processing a photoresist-coated board in accordance with Claim 2, wherein when a length of a depressed portion or a projecting portion of the raised and depressed pattern is shorter than a

predetermined length, the duty ratio of the pulse-like laser beam is varied in accordance with the length of the depressed portion or the projecting portion of the raised and depressed pattern and when a length of a depressed portion or a projecting portion of the raised and depressed pattern is equal to or longer than a predetermined length, the duty ratio of the pulse-like laser beam is kept constant independently of the length of the depressed portion or the projecting portion of the raised and depressed pattern, thereby exposing the photosensitive material layer to the laser beam.

5. A method for processing a photoresist-coated board in accordance with Claim 3, wherein when a length of a depressed portion or a projecting portion of the raised and depressed pattern is shorter than a predetermined length, the duty ratio of the pulse-like laser beam is varied in accordance with the length of the depressed portion or the projecting portion of the raised and depressed pattern and when a length of a depressed portion or a projecting portion of the raised and depressed pattern is equal to or longer than a predetermined length, the duty ratio of the pulse-like laser beam is kept constant independently of the length of the depressed portion or the projecting portion of the raised and depressed pattern, thereby exposing the photosensitive material layer to the laser beam.

6. A method for processing a photoresist-coated board in accordance with Claim 2, wherein the duty ratio of the pulse-like laser beam is varied so that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a first value when a depressed portion or a projecting portion of a raised and depressed

pattern having a first length is to be formed and that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a second value smaller than the first value when a depressed portion or a projecting portion of a raised and depressed pattern having a second length longer than the first length is to be formed.

7. A method for processing a photoresist-coated board in accordance with Claim 3, wherein the duty ratio of the pulse-like laser beam is varied so that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a first value when a depressed portion or a projecting portion of a raised and depressed pattern having a first length is to be formed and that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a second value smaller than the first value when a depressed portion or a projecting portion of a raised and depressed pattern having a second length longer than the first length is to be formed.

8. A method for processing a photoresist-coated board in accordance with Claim 4, wherein the duty ratio of the pulse-like laser beam is varied so that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a first value when a depressed portion or a projecting portion of a raised and depressed pattern having a first length is to be formed and that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a second value smaller than the first value when a depressed portion or a projecting portion of a raised and depressed

pattern having a second length longer than the first length is to be formed.

9. A method for manufacturing a stamper for a recording medium
5 comprising a step of intermittently projecting a pulse-like laser beam onto
a photosensitive material layer on or above a light absorption layer
provided in the photoresist-coated board to expose the photosensitive
material layer to the laser beam, and developing the photosensitive
10 material layer, thereby forming a raised and depressed pattern on the
photosensitive material layer and a step for transferring the raised and
depressed pattern formed on the photosensitive material layer onto the
stamper for a recording medium, thereby forming a raised and depressed
pattern on the stamper for an optical recording medium.

15 10. A method for manufacturing a stamper for a recording medium
comprising a step of forming a raised and depressed pattern including a
depressed portion or a projecting portion corresponding to a pit on a
photosensitive material layer on or above a light absorption layer
provided in a photoresist-coated board by projecting two or more pulses of
20 a laser beam onto the photosensitive material layer to expose the
photosensitive material layer thereto and developing the photosensitive
material layer, and a step of transferring the raised and depressed
pattern formed on the photosensitive material layer onto a stamper for a
recording medium and forming a raised and depressed pattern on the
25 stamper.

11. A method for manufacturing a stamper for a recording medium in
accordance with Claim 9, wherein a duty ratio of the pulse-like laser

beam is varied in accordance with a length of a depressed portion or a projecting portion of the raised and depressed pattern to be formed.

12. A method for manufacturing a stamper for a recording medium in accordance with Claim 10, wherein a duty ratio of the pulse-like laser beam is varied in accordance with a length of a depressed portion or a projecting portion of the raised and depressed pattern to be formed.

13. A method for manufacturing a stamper for a recording medium comprising a step of forming a raised and depressed pattern on a photosensitive material layer provided in a photoresist-coated board by intermittently projecting a pulse-like laser beam onto the photosensitive material layer to expose the photosensitive material layer thereto and developing the photosensitive material layer, and a step of transferring the raised and depressed pattern formed on the photosensitive material layer onto a stamper for a recording medium and forming a raised and depressed pattern on the stamper, wherein the method for manufacturing a stamper for a recording medium further comprises a step of varying a duty ratio of the pulse-like laser beam in accordance with a length of a depressed portion or a projecting portion of the raised and depressed pattern to be formed.

14. A method for manufacturing a stamper for a recording medium in accordance with Claim 11, wherein when a length of a depressed portion or a projecting portion of the raised and depressed pattern is shorter than a predetermined length, the duty ratio of the pulse-like laser beam is varied in accordance with the length of the depressed portion or the projecting portion of the raised and depressed pattern and when a length

of a depressed portion or a projecting portion of the raised and depressed pattern is equal to or longer than a predetermined length, the duty ratio of the pulse-like laser beam is kept constant independently of the length of the depressed portion or the projecting portion of the raised and depressed pattern, thereby exposing the photosensitive material layer to the laser beam.

15. A method for manufacturing a stamper for a recording medium in accordance with Claim 13, wherein when a length of a depressed portion or a projecting portion of the raised and depressed pattern is shorter than a predetermined length, the duty ratio of the pulse-like laser beam is varied in accordance with the length of the depressed portion or the projecting portion of the raised and depressed pattern and when a length of a depressed portion or a projecting portion of the raised and depressed pattern is equal to or longer than a predetermined length, the duty ratio of the pulse-like laser beam is kept constant independently of the length of the depressed portion or the projecting portion of the raised and depressed pattern, thereby exposing the photosensitive material layer to the laser beam.

20

16. A method for manufacturing a stamper for a recording medium in accordance with Claim 11, wherein the duty ratio of the pulse-like laser beam is varied so that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a first value when a depressed portion or a projecting portion of a raised and depressed pattern having a first length is to be formed and that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a second value smaller than the

first value when a depressed portion or a projecting portion of a raised and depressed pattern having a second length longer than the first length is to be formed.

5 17. A method for manufacturing a stamper for a recording medium in accordance with Claim 13, wherein the duty ratio of the pulse-like laser beam is varied so that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a first value when a depressed portion or a projecting portion of a raised and
10 depressed pattern having a first length is to be formed and that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a second value smaller than the first value when a depressed portion or a projecting portion of a raised and depressed pattern having a second length longer than the first length
15 is to be formed.

18. A method for manufacturing a stamper for a recording medium in accordance with Claim 14, wherein the duty ratio of the pulse-like laser beam is varied so that the photosensitive material layer is exposed to the
20 laser beam by setting the duty ratio of the pulse-like laser beam to a first value when a depressed portion or a projecting portion of a raised and depressed pattern having a first length is to be formed and that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a second value smaller than the
25 first value when a depressed portion or a projecting portion of a raised and depressed pattern having a second length longer than the first length is to be formed.

19. A method for manufacturing a recording medium comprising at least a step of forming a raised and depressed pattern including a depressed portion or a projecting portion corresponding to a pit on a photosensitive material layer on or above a light absorption layer provided in a photoresist-coated board by projecting two or more pulses of a laser beam onto the photosensitive material layer to expose the photosensitive material layer thereto and developing the photosensitive material layer, a step of transferring the raised and depressed pattern formed on the photosensitive material layer onto a stamper for a recording medium and forming a raised and depressed pattern on the stamper, and a step of transferring the raised and depressed pattern formed on the stamper onto a substrate for a recording medium to form pre-pits on the substrate.

20. A method for manufacturing a recording medium in accordance with Claim 19, wherein a duty ratio of the pulse-like laser beam is varied in accordance with a length of a depressed portion or a projecting portion of the raised and depressed pattern to be formed.

21. A method for manufacturing a recording medium comprising at least a step of forming a raised and depressed pattern including a depressed portion or a projecting portion corresponding to a pit on a photosensitive material layer provided in a photoresist-coated board by projecting two or more pulses of a laser beam onto the photosensitive material layer to expose the photosensitive material layer thereto and developing the photosensitive material layer, a step of transferring the raised and depressed pattern formed on the photosensitive material layer onto a stamper for an optical recording medium and forming a raised and

depressed pattern on the stamper, and a step of transferring the raised and depressed pattern formed on the stamper onto a substrate for a recording medium to form pre-pits on the substrate, wherein the method for manufacturing a recording medium further comprises a step of
5 varying a duty ratio of the pulse-like laser beam in accordance with a length of a pre-pit to be formed.

22. A method for manufacturing a recording medium in accordance with Claim 20, wherein when a length of a pre-pit is shorter than a
10 predetermined length, the duty ratio of the pulse-like laser beam is varied in accordance with the length of the pre-pit and when a length of a pre-pit is equal to or longer than a predetermined length, the duty ratio of the laser beam is kept constant independently of the length of the pre-pit, thereby exposing the photosensitive material layer to the laser beam.

15

23. A method for manufacturing a recording medium in accordance with Claim 21, wherein when a length of a pre-pit is shorter than a predetermined length, the duty ratio of the pulse-like laser beam is varied in accordance with the length of the pre-pit and when a length of a pre-pit
20 is equal to or longer than a predetermined length, the duty ratio of the pulse-like laser beam is kept constant independently of the length of the pre-pit, thereby exposing the photosensitive material layer to the laser beam.

25 24. A method for manufacturing a recording medium in accordance with Claim 20, wherein the duty ratio of the pulse-like laser beam is varied so that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a first value

when a pre-pit having a first length is to be formed and that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a second value smaller than the first value when a pre-pit having a second length longer than the first
5 length is to be formed.

25. A method for manufacturing a recording medium in accordance with Claim 21, wherein the duty ratio of the pulse-like laser beam is varied so that the photosensitive material layer is exposed to the laser
10 beam by setting the duty ratio of the pulse-like laser beam to a first value when a pre-pit having a first length is to be formed and that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a second value smaller than the first value when a pre-pit having a second length longer than the first
15 length is to be formed.

26. A method for manufacturing a recording medium in accordance with Claim 22, wherein the duty ratio of the pulse-like laser beam is varied so that the photosensitive material layer is exposed to the laser
20 beam by setting the duty ratio of the pulse-like laser beam to a first value when a pre-pit having a first length is to be formed and that the photosensitive material layer is exposed to the laser beam by setting the duty ratio of the pulse-like laser beam to a second value smaller than the first value when a pre-pit having a second length longer than the first
25 length is to be formed.

27. A photoresist-coated board constituted by laminating a light absorption layer and a photosensitive material layer on a substrate in

this order, the photosensitive material layer being formed with a raised and depressed pattern and the raised and depressed pattern of the photosensitive material layer being formed by intermittently projecting a pulse-like laser beam onto the photosensitive material layer to expose the photosensitive material layer thereto and developing the photosensitive material layer.

28. A photoresist-coated board in accordance with Claim 27, wherein the raised and depressed pattern of the photosensitive material layer is formed by intermittently projecting on the photosensitive material layer the pulse-like laser beam whose duty ratio is varied in accordance with a length of a depressed portion or a projecting portion of the raised and depressed pattern and developing the photosensitive material layer.

29. A photoresist-coated board constituted by laminating a photosensitive material layer on a substrate, the photosensitive material layer being formed with a raised and depressed pattern and the raised and depressed pattern of the photosensitive material layer being formed by intermittently projecting a pulse-like laser beam onto the photosensitive material layer to expose the photosensitive material layer thereto and developing the photosensitive material layer.

30. A stamper for a recording medium having a raised and depressed pattern formed by transferring the raised and depressed pattern of a photoresist-coated board thereonto, the photoresist-coated board being constituted by laminating a light absorption layer and a photosensitive material layer on a substrate in this order, the photosensitive material layer being formed with a raised and depressed pattern and the raised

and depressed pattern of the photosensitive material layer being formed by projecting a pulse-like laser beam onto the photosensitive material layer to expose the photosensitive material layer thereto and developing the photosensitive material layer.

5

31. A stamper for a recording medium having a raised and depressed pattern formed by transferring the raised and depressed pattern of a photoresist-coated board thereonto, the photoresist-coated board being constituted by laminating a light absorption layer and a photosensitive material layer on a substrate in this order, the photosensitive material layer being formed with a raised and depressed pattern and the raised and depressed pattern of the photosensitive material layer being formed by projecting a pulse-like laser beam whose duty ratio is varied in accordance with a length of a depressed portion or a projecting portion of the raised and depressed pattern onto the photosensitive material layer to expose the photosensitive material layer thereto and developing the photosensitive material layer.

32. A stamper for a recording medium having a raised and depressed pattern formed by transferring the raised and depressed pattern of a photoresist-coated board thereonto, the photoresist-coated board being constituted by laminating a photosensitive material layer on a substrate, the photosensitive material layer being formed with a raised and depressed pattern and the raised and depressed pattern of the photosensitive material layer being formed by intermittently projecting a pulse-like laser beam onto the photosensitive material layer to expose the photosensitive material layer thereto and developing the photosensitive material layer.

33. A recording medium having pre-pits formed by transferring a raised and depressed pattern of a stamper for a recording medium thereonto, the raised and depressed pattern of the stamper for a recording medium being formed by transferring a raised and depressed pattern of photoresist-coated board thereonto, the photoresist-coated board being constituted by laminating a light absorption layer and a photosensitive material layer on a substrate in this order, the photosensitive material layer being formed with a raised and depressed pattern and the raised and depressed pattern of the photosensitive material layer being formed by intermittently projecting a pulse-like laser beam onto the photosensitive material layer to expose the photosensitive material layer thereto and developing the photosensitive material layer.

34. A recording medium having pre-pits formed by transferring a raised and depressed pattern of a stamper for a recording medium thereonto, the raised and depressed pattern of the stamper for a recording medium being formed by transferring a raised and depressed pattern of photoresist-coated board thereonto, the photoresist-coated board being constituted by laminating a light absorption layer and a photosensitive material layer on a substrate in this order, the photosensitive material layer being formed with a raised and depressed pattern and the raised and depressed pattern of the photosensitive material layer being formed by intermittently projecting a pulse-like laser beam whose duty ratio is varied in accordance with a length of a depressed portion or a projecting portion of the raised and depressed pattern onto the photosensitive material layer to expose the photosensitive material layer thereto and developing the photosensitive material layer.

35. A recording medium having pre-pits formed by transferring a raised and depressed pattern of a stamper for a recording medium thereonto, the raised and depressed pattern of the stamper for a recording
5 medium being formed by transferring a raised and depressed pattern of photoresist-coated board thereonto, the photoresist-coated board being constituted by laminating a photosensitive material layer on a substrate, the photosensitive material layer being formed with a raised and depressed pattern and the raised and depressed pattern of the
10 photosensitive material layer being formed by intermittently projecting a pulse-like laser beam onto the photosensitive material layer to expose the photosensitive material layer thereto and developing the photosensitive material layer.